

sets of masks. This means that the total number of the necessary masks and fabrication processes are large. Three different metals are used for emitter, base and collector of the hetero-junction bipolar transistor. This makes the fabrication processes complicated. It is desired to avoid any further increase in the number of the fabrication processes.--

Page 3, replace the paragraph beginning on line 20, bridging page 21, as follows:

--A primary aspect of the present invention is a monolithically integrated semiconductor device comprising: a hetero-junction bipolar transistor having at least an electrode contact layer which contacts directly with at least one of collector, base and emitter electrodes; and at least a passive device having at least a passive device electrode and at least a resistive layer, wherein the electrode contact layer and the resistive layer comprise the same compound semiconductor layer, and the electrode contact layer and the resistive layer are concurrently formed in the same processes. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 5, replace the paragraph beginning on line 12 as follows:

--A first aspect of the present invention is a monolithically integrated semiconductor device comprising: a

hetero-junction bipolar transistor having at least an electrode contact layer which contacts directly with at least one of collector, base and emitter electrodes; and at least a passive device having at least a passive device electrode and at least a resistive layer, wherein the electrode contact layer and the resistive layer comprise the same compound semiconductor layer. The electrode contact layer and the resistive layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 6, replace the paragraph beginning on line 3 as follows:

--It is also possible that the at least one passive device further comprises: a resistive element which comprises: at least a resistive element layer; and at least a resistive element electrode; and a metal-insulator-metal capacitor which comprises: a bottom electrode; a capacitive dielectric layer; and a top electrode. It is further possible that the at least electrode contact layer comprises a base electrode contact layer which contacts directly with the base electrode. It is further more possible that the base electrode contact layer, the resistive element layer and the capacitive dielectric layer comprise the same compound semiconductor layer. The base electrode contact layer, the resistive element layer and the capacitive dielectric layer are concurrently formed in the same

process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 6, replace the paragraph beginning on line 16 as follows:

--It is moreover possible that the base electrode and the bottom electrode comprise the same metal layer. The base electrode and the bottom electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 6, replace the paragraph beginning on line 20 as follows:

--It is also possible that the base electrode and the top electrode comprise the same metal layer. The base electrode and the top electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 6, replace the paragraph beginning on line 24, bridging page 7, as follows:

--It is also possible that the base electrode and the resistive element electrodes comprise the same metal layer. The base electrode and the resistive element electrodes are

concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 7, replace the paragraph beginning on line 5 as follows:

--It is possible that the at least one electrode contact layer comprises a collector electrode contact layer which contacts directly with the collector electrode. It is further possible that the collector electrode contact layer, the resistive element layer and the capacitive dielectric layer comprise the same compound semiconductor layer. The collector electrode contact layer, the resistive element layer and the capacitive dielectric layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 7, replace the paragraph beginning on line 13 as follows:

--It is further more possible that the collector electrode and the bottom electrode comprise the same metal layer. The collector electrode and the bottom electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 7, replace the paragraph beginning on line 18 as follows:

--It is possible that the collector electrode and the top electrode comprise the same metal layer. The collector electrode and the top electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 7, replace the paragraph beginning on line 22, bridging page 8, as follows:

--It is also possible that the collector electrode and the resistive element electrodes comprise the same metal layer. The collector electrode and the resistive element electrodes are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 8, replace the paragraph beginning on line 3 as follows:

--It is also possible to that the at least one electrode contact layer comprises an emitter electrode contact layer which contacts directly with the emitter electrode. It is further more possible that the emitter electrode contact layer, the resistive element layer and the capacitive dielectric layer comprise the same compound semiconductor layer. The emitter electrode contact layer, the resistive element layer and the

capacitive dielectric layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 8, replace the paragraph beginning on line 11 as follows:

--It is further more possible that the emitter electrode and the bottom electrode comprise the same metal layer. The emitter electrode and the bottom electrode comprise the same metal layer. The emitter electrode and the bottom electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 8, replace the paragraph beginning on line 16 as follows:

--It is also possible that the emitter electrode and the top electrode comprise the same metal layer. The emitter electrode and the top electrode and the resistive element electrodes are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 8, replace the paragraph beginning on line 20 as follows:

--It is also possible that the emitter electrode and the resistive element electrodes comprise the same metal layer. The emitter electrode and the resistive element electrodes are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 9, replace the paragraph beginning on line 1 as follows:

--It is also possible that the at least passive device further comprises: a resistive element which comprises: at least a resistive element layer; and at least a resistive element electrode. It is further more possible that the at least electrode contact layer comprises a base electrode contact layer which contacts directly with the base electrode. It is moreover possible that the base electrode contact layer and the resistive element layer comprise the same compound semiconductor layer. The base electrode contact layer and the resistive element layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 9, replace the paragraph beginning on line 11 as follows:

--It is still more possible that the base electrode and the resistive element electrodes comprise the same metal layer. The base electrode and the resistive element electrodes are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 9, replace the paragraph beginning on line 16 as follows:

--It is also possible that the at least electrode contact layer comprises a collector electrode contact layer which contacts directly with the collector electrode. It is further possible that the collector electrode contact layer and the resistive element layer comprise the same compound semiconductor layer. The collector electrode contact layer and the resistive element layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 9, replace the paragraph beginning on line 23, bridging page 10, as follows:

--It is further more possible that the collector electrode and the resistive element electrodes comprise the same metal layer. The collector electrode and the resistive element



electrodes are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 10, replace the paragraph beginning on line 4 as follows:

--It is also possible that the at least electrode contact layer comprises an emitter electrode contact layer which contacts directly with the emitter electrode. It is further more possible that the emitter electrode contact layer and the resistive element layer comprise the same compound semiconductor layer. The emitter electrode contact layer and the resistive element layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 10, replace the paragraph beginning on line 11 as follows:

--It is also possible that the emitter electrode and the resistive element electrodes comprise the same metal layer. The emitter electrode and the resistive element electrodes are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 10, replace the paragraph beginning on line 16 as follows:

--It is also possible that the at least passive device further comprises: a metal-insulator-metal capacitor which comprises: a bottom electrode; a capacitive dielectric layer; and a top electrode.--

Page 10, replace the paragraph beginning on line 24, bridging page 11, as follows:

--It is moreover possible that the base electrode and the bottom electrode comprise the same metal layer. The base electrode and the bottom electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

--Page 11, replace the paragraph beginning on line 4 as follows:

--It is also possible that the base electrode and the top electrode comprise the same metal layer. The base electrode and the top electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 11, replace the paragraph beginning on line 8 as follows:

--It is also possible that the at least electrode contact layer comprises a collector electrode contact layer which contacts directly with the collector electrode. It is further more possible that the collector electrode contact layer and the capacitive dielectric layer comprise the same compound semiconductor layer. The collector electrode contact layer and the capacitive dielectric layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 11, replace the paragraph beginning on line 16 as follows:

--It is still more possible that the collector electrode and the bottom electrode comprise the same metal layer. The collector electrode and the bottom electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 11, replace the paragraph beginning on line 21 as follows:

--It is also possible that the collector electrode and the top electrode comprise the same metal layer. The collector electrode and the top electrode are concurrently formed in the

same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 12, replace the paragraph beginning on line 1 as follows:

--It is also possible that the at least electrode contact layer comprises an emitter electrode contact layer which contacts directly with the emitter electrode. It is further possible that the emitter electrode contact layer and the capacitive dielectric layer comprise the same compound semiconductor layer. The emitter electrode contact layer and the capacitive dielectric layer are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 12, replace the paragraph beginning on line 8 as follows:

--It is further more possible that the emitter electrode and the bottom electrode comprise the same metal layer. The emitter electrode and the bottom electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 12, replace the paragraph beginning on line 13 as follows:

--It is also possible that the emitter electrode and the top electrode comprise the same metal layer. The emitter electrode and the top electrode are concurrently formed in the same process. This reduces the number of the fabrication processes and the manufacturing cost.--

Page 12, replace the paragraph beginning on line 17 as follows:

--A second aspect of the present invention is a monolithically integrated semiconductor device comprising: a hetero-junction bipolar transistor having at least an electrode contact layer which contacts directly with at least one of collector, base and emitter electrodes; and at least a passive device having at least a passive device electrode and at least a resistive layer, wherein the passive device electrode and one of the collector, base and emitter electrodes comprises the same metal layer.--

Page 13, replace the paragraph beginning on line 3 as follows:

--It is also possible that the electrode contact layer and the resistive layer comprise the same compound semiconductor layer. It is further possible that the at least passive device

further comprises: a resistive element which comprises: at least a resistive element layer; and at least a resistive element electrode; and a metal-insulator-metal capacitor which comprises: a bottom electrode; a capacitive dielectric layer; and a top electrode.--

Page 13, replace the paragraph beginning on line 10 as follows:

--It is also possible that the at least passive device further comprises: a resistive element which comprises: at least a resistive element layer; and at least a resistive element electrode.--

Page 13, replace the paragraph beginning on line 13 as follows:

--It is also possible that the at least passive device further comprises: a metal-insulator-metal capacitor which comprises: a bottom electrode; a capacitive dielectric layer; and a top electrode.--

Page 13, replace the paragraph beginning on line 16, bridging page 14, as follows:

--A third aspect of the present invention is a monolithically integrated semiconductor device comprising: a hetero-junction bipolar transistor having at least an electrode

contact layer which contacts directly with at least one of collector, base and emitter electrodes; a resistive element which comprises: at least a resistive element layer; and at least a resistive element electrode; and a metal-insulator-metal capacitor which comprises: a bottom electrode; a capacitive dielectric layer; and a top electrode, wherein the electrode contact layer, the resistive element layer and the capacitive dielectric layer comprise the same compound semiconductor layer, and wherein the resistive element electrode, the top electrode and the at least one of collector, base and emitter electrodes comprises the same metal layer.--

Page 14, replace the paragraph beginning on line 7 as follows:

--A fourth aspect of the present invention is a method of forming a monolithically integrated semiconductor device comprising: a hetero-junction bipolar transistor having at least an electrode contact layer which contacts directly with at least one of collector, base and emitter electrodes[]; and at least a passive device having at least a passive device electrode and at least a resistive layer, wherein the electrode contact layer and the resistive layer are formed concurrently in the same processes.--

Page 14, replace the paragraph beginning on line 16 as follows:

--It is also possible that the passive device electrode and one of the collector, base and emitter electrodes are formed concurrently in the same process.--

Page 14, replace the paragraph beginning on line 23, bridging page 15, as follows:

--A fifth aspect of the present invention is a method of forming a monolithically integrated semiconductor device comprising: a hetero-junction bipolar transistor having at least an electrode contact layer which contacts directly with at least one of collector, base and emitter electrodes; and at least a passive device having at least a passive device electrode and at least a resistive layer, wherein the passive device electrode and one of the collector, base and emitter electrodes are formed concurrently in the same processes.--

Page 15, replace the paragraph beginning on line 10 as follows:

--It is also possible that the electrode contact layer and the resistive layer are formed concurrently in the same process.--



Page 15, replace the paragraph beginning on line 12 as follows:

--A sixth aspect of the present invention is a monolithically integrated semiconductor device comprising: a hetero-junction bipolar transistor having at least an electrode contact layer which contacts directly with at least one of collector, base and emitter electrodes; a resistive element which comprises: at least a resistive element layer; and at least a resistive element electrode; and a metal-insulator-metal capacitor which comprises: a bottom electrode; a capacitive dielectric layer; and a top electrode, wherein the electrode contact layer, the resistive element layer and the capacitive dielectric layer are formed concurrently in the same processes, and wherein the resistive element electrode, the top electrode and the at least one of collector, base and emitter electrodes are formed concurrently in the same process.--

Page 16, replace the paragraph beginning on line 7 as follows:

--A first embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 1 is a fragmentary cross sectional elevation view of a monolithic microwave integrated circuit in a first embodiment in accordance with the present invention. A monolithic microwave integrated circuit is provided on a semi-insulating GaAs substrate 10. The

monolithic microwave integrated circuit has a monolithic integration of a hetero-junction bipolar transistor 100, a resistive element 200 and a metal-insulator-metal capacitor 300.--

Page 16, replace the paragraph beginning on line 15 as follows:

--The hetero-junction bipolar transistor 100 has an emitter electrode 20, a base electrode 21, and a collector electrode 22. The restive element 200 has a p+-GaAs resistive layer 24 and resistive element electrodes 26. The metal-insulating-metal capacitor 300 has a bottom electrode 23, a p+-GaAs polycrystalline layer 25, and a top electrode 27, wherein the p+-GaAs polycrystalline layer 25 is sandwiched between the top and bottom electrodes 27 and 23, so that the p+-GaAs polycrystalline layer 25 serves as a dielectric, which is a medium capable of maintaining an electric field with no supply of energy from outside source.--

Page 25, replace the paragraph beginning on line 3 as follows:

--The base electrodes 21 overlie the p+-GaAs base electrode contact layers 18 with a reduced contact resistance, which reduces a parasitic capacitance. The reduced parasitic

capacitance improves high frequency performance of the hetero-junction bipolar transistor.--

Page 28, replace the paragraph beginning on line 21 as follows:

--The base electrodes 21 overlie the p+-GaAs base electrode contact layers 18 with a reduced contact resistance, which reduces a parasitic capacitance. The reduced parasitic capacitance improves high frequency performance of the hetero-junction bipolar transistor.--

Page 38, replace the paragraph beginning on line 9 as follows:

--It is possible as a modification to change the compound of the semiconductors. The monolithic microwave integrated circuit is formed over an InP substrate 10. The hetero-junction bipolar transistor 100 has the emitter electrode 20, the base electrode 21, and the collector electrode 22. The resistive element 200 has a p+-InGaAs resistive layer 24 and resistive element electrodes 26. The metal-insulating-metal capacitor 300 has a bottom electrode 23, an n+-InGaAs polycrystalline layer 25, and a top electrode 27, wherein the n+-InGaAs polycrystalline layer 25 is sandwiched between the top and bottom electrodes 27 and 23, so that the n+-InGaAs polycrystalline layer 25 serves as a dielectric, which is a